Zero Retries issue 0031 2022-02-04

Advanced Amateur Radio - Data Communications; Space; Microwave… the fun stuff! The Universal Purpose of Ham Radio is to have fun messing around with radios - Bob Witte K0NR. Ultimately, amateur radio must prove that it is useful for society - Dr. Karl Meinzer DJ4ZC. We are confronted by insurmountable opportunities! - Pogo. Nothing great has ever been accomplished without irrational exuberance - Tom Evslin. Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ.

In its mission to grow Amateur Radio and make it more relevant to society in the 2020s and beyond, Zero Retries is published via email and the web, and is available to everyone at no cost. Zero Retries is proud to not participate in the Amateur Radio Publishing Industrial Complex!

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor

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Request To Send

Countdown to Hamvention 2022 - May 20-22, in Xenia, Ohio - 15 weeks…

By popular demand! More LoRa / LoRaWAN coming soon. I offered a "glancing blow" treatment of LoRa and LoRaWAN in Zero Retries 0030. *Oops*… I had a number of "substantive feedback" emails in response, and it's now obvious that LoRa / LoRaWAN is a topic of high interest to Zero Retries subscribers. *Now noted*. Because of (next paragraph), I couldn't get all of the replies editorially massaged in time for this issue, but all of that info is prominently parked in the draft of Zero Retries 0032, along with all the other stuff that's piling up in another backlog. Good problem to have for a newsletter!

I spent most of this week working on "Big Project for Organization X" that requests that I not disclose the organization's name or the project. (It's not ARDC.) I was honored to be asked to participate in "Big Project…" as it is something I respect. I'm proud of my part in "Big Project for Organization X", and look forward to it being revealed at some point in the future. I turned in my last bits late on Thursday, which left "most of" today to put Zero Retries together.

Working on Zero Retries is sufficiently stimulating to me that, at times, something "Zero Retries Interesting" surfaces and I can't get that subject out of my thoughts until I get it into text. Sometimes that precludes sleep, and so I break out the laptop in the reading corner of our bedroom and work on Zero Retries into the wee hours. Early on in Zero Retries, I was doing some late night editing and Jack "offered to help" as you see in the photo below. Jack has now been doing so for most of the life of Zero Retries, quietly assuming the role of "Late Night Assistant Editor".

Jack Stroh - Zero Retries Late Night Assistant Editor

Jack was reluctant to pose for this photo (he's pretty modest), but I convinced him of the popular demand from you Zero Retries subscribers, so he agreed this one time. I think this photo captures him right after I had uttered an expletive about how cool I thought something was as I was writing about it.

Thanks to those few who spotted the Easter Egg in Zero Retries 0030. Yeah, that was a pretty good day.

de N8GNJ

Roundup of "Zero Retries Interesting" ARDC Grants in 2021

I was asked by a "priority" subscriber to provide some "layperson" context in my stories here in Zero Retries. It was a reasonable request, and I'll try to do so from now on as the first paragraph of the story if the context might not be readily apparent.

Amateur Radio Digital Communications (ARDC) is a philanthropic organization that awards grants in three broad categories - Support and Growth of Amateur Radio, Education, and Technical Innovation. ARDC's grants are proving to be transformational in Amateur Radio… and ARDC has only been fully operational / fully staffed since mid-2021. ARDC's activity in 2022 will be very interesting. Despite no reference to it in their mission statement, yes, ARDC still actively manages and works to grow Net44 / AMPRNet.

Disclaimer - In 2021 I was, and in 2022 I am, a volunteer member of the ARDC Grants Advisory Committee. The opinions expressed here are my own and do not represent the views of ARDC. All the information presented in this article is either publicly released or personal opinion based on publicly released information.

This is likely my last mention of ARDC grants awarded in 2021; if I wait much longer, these grants will be kind of stale news. Towards the end of 2021, there were some very "Zero Retries Interesting" grants awarded by ARDC, and thus worth mentioning here. Because of limited space, these mentions will be "terse". I'm skipping "ZRI" grants that have previously discussed in Zero Retries. See the links for the details.

First, I'm really proud and impressed that there were a number of ARDC grants for scholarships for underrepresented groups. In my opinion, it's transformational in one's life to be able to pursue an advanced education, and especially when doing so doesn't leave you impoverished.

Digital HF Telecommunications for Civil and Amateur Uses. I wish I could go into the specifics of why I consider this organization, and its ARDC grant, so promising. Unfortunately the grant information that's public, and the RHIZOMATICA HERMES website simply don't do justice to what they intend to accomplish with their ARDC grant. Suffice it to say that they understand the problem they are trying to solve very well, and know what to do, and how, specifically, they can solve their problem with their ARDC grant. In my opinion, they're tackling a problem that very much needs to be solved, and their solution is much more widely applicable than their particular use case. As with all ARDC grants, the systems they develop with an ARDC grant will be open source, and I'm very much looking forward to following their progress.

Equipping digital radio site infrastructure in the SeaTac area. Not only is this group only 100 miles from Bellingham, but they're doing a lot of the same thing I'd like to be doing in Whatcom County - mesh networking, Winlink + VARA, and DMR. I'll be comparing notes with their progress.

Fixing the Linux kernel AX.25. This is a *big* deal. There have been known issues with the AX.25 portions of the Linux kernel for many years now. However, working within the Linux kernel (in this era) requires intense, focused, professional effort. This will pay significant dividends in Amateur Radio networking.

Grantmaking Effort to Support Radio Network in Europe.

> Part I: Boost and secure European HAMNET expansion by providing sponsored hardware for radio links making use of the AMPRNet IP space in Europe.
>
> - DARC e.V. will provide a Europe-based hardware granting team who will review proposals, identify weak links within the network and propose upgrades, and identify opportunities to strengthen the HAMNET and make new site and link proposals.
>
> Part II: Enable HAMNET Europe (which is part of the AMPRNet) to:
>
> - Upgrade its back-end infrastructure, and
> - Evaluate RF hardware to activate new bands (70-cm, 23-cm, 3-cm)

Very cool, all of it. We need more work like this to systemically evaluate and execute on better methods (*radios!*) of Amateur Radio (higher / high speed) networking.

M17 Open Protocol. This is an exciting project to (as I understand it) create a digital voice (and some data) system equivalent to Digital Mobile Radio (DMR). Unlike DMR, M17 will use the open source Codec2 coder / decoder (CODEC) for digital voice. All of the other elements of the system - radio hardware, protocols, networking, etc. will be open source. I wish the M17 Project provided more regular updates of their accomplishments, at least easily discoverable in one place, such as articles on their website.

Stay tuned to ARDC via their newsletter, press releases, mentions of ARDC in the news, blog, Twitter feed, Community Meetings, and they even have a LinkedIn page. As I write this, ARDC has not yet released their 2021 Annual Report, which will provide much more detail on all of its 2021 activities. In the meantime, ARDC's slide deck from their 2022-01-29 Community Call is a good read.

Text Messaging on Motorola Solutions Talkabout T800 GMRS Portable Radio

I've long fantasized about being able to sit down at a coffee shop, turn on my favorite device (pocket computer, laptop, whatever) and connect to my Amateur Radio colleagues *via Amateur Radio* (not Internet, not cellular, not Wi-Fi). Unless you build your own (the closest I've ever gotten was the size of a 20mm ammo can), we've never gotten close to this ideal… until this past year.

GL-iNet GL-USB150 USB Wireless Router. Image courtesy of GL-iNet.

The closest to this idea, in my experience, is the GL-iNet GL-USB150 USB Wireless Router. It looks like a USB flash drive, but it's a complete 2.4 GHz Wi-Fi router. It presents to the host computer as an Ethernet adapter, and is powered by USB. What makes it "Amateur Radio" is that it can be flashed with AREDN firmware and thus you can connect to a nearby AREDN node on 2.39 - 2.40 GHz with all the conveniences of your laptop. Sadly, it appears as this device is out of production. But I digress…

The "… with your pocket computer" idea is now maddeningly close. In one of my news feeds, the videocast AmateurLogic 165 came up with an intriguing text snippet: *Emile talks GMRS Data modes*. Huh? So I looked. In that episode, Emile Diodene KE5QKR discussed an FCC rules revision a few years ago for General Mobile Radio Service (GMRS) and Family Radio Service (FRS) permitting "small data" modes, such as text messages and position data. KE5QKR researched currently available GMRS radios that were data-capable and found the Motorola Solutions Talkabout T800 portable radios. (He also found another line of GMRS radios that incorporated data, but those aren't germane to this discussion.)

Motorola Solutions Talkabout T800. Image courtesy of Motorola Solutions.

What's remarkable about the Talkabout T800 is how well-integrated… "cleanly"… these radios seem to have implemented text messaging via GMRS. Download the Talkabout App (available for both Android and IOS), and using Bluetooth, pair your pocket computer with a T800. Then, use the app to send text messages *via the portable radio - no Internet, no cellular required!* The T800s are very reasonably priced - under $100 for a pair on Amazon, so of course, I purchased a pair. The app is free to download. (There *may* be some "gotchas" in the app - I haven't gotten far enough to really look yet.)

Not wanting to be "one of those cretins" who don't bother with niceties such as obtaining required licenses, I tried to register for a GMRS license on the FCC website. Midland Radio's WHY DO I NEED A GMRS LICENSE & HOW DO I GET IT? is pretty informative. Attempt 1 was stymied because the FCC website doesn't like Apple's Safari web browser. Attempt 2, using Firefox web browser, was stymied because at the point of being ready to input my credit card info for the $70 fee for a 10 year license, the card input page stubbornly refused to appear, and timed out with an ominous error message something to the effect of *Illegal Access Attempted to a Federal Government System*. Once I saw *that* twice, I decided to try again later, perhaps with a newly installed copy of Chrome browser. (Afterwards, I'll delete Chrome as I *detest* its integral Google spyware.)

But of course, The T800 is for GMRS, and *we're Amateur Radio*! I'm unaware of something equivalent… this clean… for Amateur Radio. ***There should be!*** I have a vague memory that there's something close in the Kenwood TH-D74A (sadly, no longer in production) because of this feature blurb: *Micro USB (Serial, Mass Storage Class, USB Audio) to enable use of external decoding software* ***Bluetooth*** *(SPP, HSP) support*. But it's hobbled by unnecessary complexities of APRS, packet radio, etc. There are other solutions (albeit using wired connections) nearly as "clean" for laptops such as Digirig Mobile. Perhaps T800's text messaging capability could be a model for how "small data" can work in the M17 Project (see above).

Again, I've just gotten started in this experiment, and I want to have my GMRS license in hand before I go any further, but I can see some significant utility in *this* combination, such as communication when in wilderness areas, ski cabins, etc. Especially given that this doesn't require an *Amateur Radio* license (but it does require a "no-test, just pay the fee" GMRS license). I'm particularly interested to see how it works with more than one pair of T800 radios - how big a group can you do text messaging with? How do you identify which radio you want to text to? Can you do group chats? Does it work via GMRS repeaters? And of course, diving deep into the technology, eventually I'll want to figure out how Motorola Solutions implemented the data communications between the individual radios - what modulation, what data rate, how sophisticated (Forward Error Correction?), etc. Fortunately I have a capable friend who might enjoy that challenge.

Ultimately, I think the simplicity of the app + portable radio paradigm of the T800 text messaging capability is close to what we should strive for in Amateur Radio; we *need* something sexy like this to show off some of what we can do with Amateur Radio.

ZR > BEACON

- **Raspberry Pi 64-bit OS** is now officially supported. I said on Twitter when this news emerged:

  > Yay 64-bit! It's just cooler! What startled me about this announcement is that the $10 or $15 Raspberry Pi Zero 2 can run a 64-bit OS. Ah-mAz-Ing!!! (Says an old school person whose first touch on a physical computer was the toggle switches on an Altair 8800.)

  At this moment, 64-bit isn't going to make a lot of difference in Amateur Radio usage of the Raspberry Pi computers. Supply constraints will eventually ease and the Raspberry Pi 4s become more common, especially the 4 GB and 8 GB versions. Using those advanced versions, with a 64-bit OS, I suspect that a lot of software defined radio software that currently requires computers more powerful than the (currently mainstream) Raspberry Pi 3B+ to run effectively, will be able to run on a Raspberry Pi 4 / 8 GB RAM, with SSDs (instead of SD cards). I don't think it's a stretch that within a couple of years, many Amateur Radio Operators will have a high-performance software defined receiver in their shack, accessible via Internet, for a total investment under $200.

- CNN: Unknown space object beaming out radio signals every 18 minutes remains a mystery

  > While mapping radio waves across the universe, astronomers happened upon a celestial object releasing giant bursts of energy -- and it's unlike anything they've ever seen before.
  >
  > The spinning space object, spotted in March 2018, beamed out radiation three times per hour. In those moments, it became the brightest source of radio waves viewable from Earth, acting like a celestial lighthouse.
  >
  > Astronomers think it might be a remnant of a collapsed star, either a dense neutron star or a dead white dwarf star, with a strong magnetic field -- or it could be something else entirely.

  Talk about a *beacon!*

- **QSO Today Virtual Ham Expo Call for Speakers**

> The QSO Today Virtual Ham Expo, will return on March 12th and 13th, 2022, is calling for international speakers on any amateur radio subject. More details and application here.

I enjoyed the previous version of this event. There were some unique talks that I had not heard previously at all. I'll be paying for a ticket to have same-day access to the talks.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is a great overview of Amateur Radio. N0AX is a gifted writer and HRFD is now in its 4th edition.
- My two favorite **YouTube** channels for a good overview of Amateur Radio are AmateurLogic.TV. and Ham Nation (part of Ham Radio Crash Course). These folks just seem to have so much fun!
- Radio Amateur Training Planning and Activities Committee (**RATPAC**) offers weekly presentations on general Amateur Radio topics (Wednesdays) and emergency communications in Amateur Radio (Thursdays).
- Dan Romanchik KB6NU offers a free **No-Nonsense Study Guide** for the Technician test (PDF).
- HamExam.org Amateur Radio Practice Exams offers good **Flash Card and Practice Exams**.
- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers remote exams, free for students and youngsters. *There are apparently many other remote exam options*.

Bonus - with an Amateur Radio license, you'll be more attractive on dates 😀

Closing the Channel

- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything*, Bill Vodall W7NWP as *Zero Retries Instigator in Chief*, and Larry Gadallah NM7A for his long term encouragement about Zero Retries.
- My ongoing Thanks to pseudostaffers Dan Romanchik KB6NU, Jeff Davis KE9V, and Steve Lampereur KB9MWR for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.
- Southgate Amateur Radio News consistently surfaces "Zero Retries Interesting" stories.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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All previous issues of Zero Retries are available without restriction (no paywalls). For some background, Zero Retries 0000 was the **Introduction Issue**. Zero Retries 0026 and Zero Retries 0027 were a **2021 Year End Review** of Zero Retries.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ (He / Him)
These bits were handcrafted in beautiful (but could be sunnier…) Bellingham, Washington, USA
2022-02-04

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